

PENDING CLAIMS:

The currently pending claims, as originally filed, are provided as follows:

- 1 1. (Currently Amended) A wireless communication system comprising:
  - 2 a plurality of spatially separate transceiver antennae to transmit a corresponding
  - 3 plurality of data streams comprising a communication channel to a remote receiver
  - 4 having a plurality of receiver antennae, each transceiver spatially separate from at least
  - 5 one other transceiver antenna, each transceiver antenna further comprising a transceiver
  - 6 antenna polarization, at least one transceiver antenna having a polarization that is
  - 7 different than at least one other transceiver antenna, each transceiver antenna transmitting
  - 8 a corresponding data stream;
  - 9 a plurality of receiver antennae, the receiver antennae receiving at least one data
  - 10 stream, wherein
  - 11 the communication channel between the transceiver antennae and the receiver
  - 12 antennae is characterized by a channel matrix, and wherein the transceiver antenna
  - 13 polarization of each transceiver antenna is ~~pre-set to optimize~~ determined by reducing a
  - 14 measure of a singular value spread of the channel matrix to improve a separability of the
  - 15 received data streams.
- 1 2. (Currently Amended) The wireless communication system of claim 1, wherein:
  - 2 the ~~pre-set~~ transceiver antenna polarization of each transceiver antenna is determined
  - 3 experimentally.

1 3. (Currently Amended) The wireless communication system of claim 2, wherein  
2 the ~~pre-set~~ transceiver antenna polarization of each transceiver antenna is experimentally  
3 determined by characterizing the separability of received data streams.

1 4. *Please cancel claim 4, without prejudice.*

1 5. (Original) The wireless communication system of claim 1, wherein each receiver  
2 antenna is spatially separate from at least one other receiver antenna, each receiver  
3 antenna further comprising a receiver antenna polarization, at least one receiver antenna  
4 having a polarization that is different than at least one other receiver antenna.

1 6. (Currently Amended) The wireless communication system of claim 1, further  
2 comprising a receiver that is connected to the receiver antenna, the receiver including  
3 electronic circuitry for estimating a the channel matrix that represents a the transmission  
4 channel between the transceiver antennae and the receiver antennae, the ~~pre-set~~  
5 transceiver antenna polarization of each transceiver antenna being determined by  
6 minimizing a reducing the measure of the singular value spread of the channel matrix.

1 7. (Currently Amended) The wireless communication system of claim 5, wherein  
2 the receiver antenna polarization of each receiver antenna is pre-set to optimize  
3 separability of the received data streams.

1 8. (Currently Amended) The wireless communication system of claim 7, wherein  
2 the pre-set receiver antenna polarization of each receiver antenna is determined  
3 experimentally.

1 9. *Please cancel claim 9, without prejudice.*

1 10. (Original) The wireless communication system of claim 1, wherein the transceiver  
2 antenna polarization of each transceiver antenna is pre-set to minimize correlation  
3 between the data streams.

1 11. (Original) The wireless communication system of claim 10, wherein the pre-set  
2 transceiver antenna polarization of each transceiver antenna is determined  
3 experimentally.

1 12. (Original) The wireless communication system of claim 11, wherein a transmission  
2 channel between the transceiver antennae and the receiver antennae is estimated with a  
3 channel matrix, and wherein the pre-set transceiver antenna polarization of each  
4 transceiver antenna is experimentally determined by minimizing a correlation coefficient  
5 of the channel matrix.

1 13. (Original) The wireless communication system of claim 5, wherein the receiver  
2 antenna polarization of each receiver antenna is pre-set to minimize correlation between  
3 the data streams.

1 14. (Original) The wireless communication system of claim 13, wherein the pre-set  
2 receiver antenna polarization of each receiver antenna is determined experimentally.

1 15. (Original) The wireless communication system of claim 14, wherein a transmission  
2 channel between the transceiver antennae and the receiver antennae is estimated with a  
3 channel matrix, and wherein the pre-set receiver antenna polarization of each receiver  
4 antenna is experimentally determined by minimizing a correlation coefficient of the  
5 channel matrix.

1 16. (Original) The wireless communication system of claim 1, further comprising  
2 clusters of transceiver antennae, each cluster including a transmission channel, wherein  
3 the pre-set transceiver antenna polarization of each transceiver antenna is experimentally  
4 determined by minimizing co-channel interference between the clusters.

1 17. (Currently Amended) A wireless communication system comprising:  
2       a plurality of spatially separate transceiver antennae to transmit a corresponding  
3 plurality of data streams comprising a communication channel to a remote receiver  
4 having a plurality of receiver antennae, each transceiver spatially separate from at least  
5 one other transceiver antenna, each transceiver antenna further comprising a transceiver  
6 antenna polarization, at least one transceiver antenna having a polarization that is  
7 different than at least one other transceiver antenna, each transceiver antenna transmitting  
8 a corresponding data stream;

9 ~~a plurality of receiver antennae, the receiver antennae receiving at least one data~~  
10 ~~stream; wherein~~

11 ~~the communication channel between the transceiver antennae and the receiver~~  
12 ~~antennae is characterized by a channel matrix, and wherein the transceiver antenna~~  
13 ~~polarization of each transceiver antenna is adaptively set to optimize reduce a measure of~~  
14 ~~singular value spread of the channel matrix separability of the received data streams base~~  
15 ~~on channel parameters determined within a receiver connected to the receiver antennae.~~

1 18. (Currently Amended) The wireless communication system of claim 17, wherein  
2 the receiver includes electronic circuitry for estimating ~~a~~ the channel matrix that represent  
3 a transmission channel between the transceiver antennae and the receiver antennae, the  
4 transceiver antenna polarization of each transceiver antenna being adaptively set by  
5 minimizing ~~a~~ the singular value spread of the channel matrix.

1 19. (Original) A method of wirelessly communicating between a transceiver and a  
2 receiver within a wireless communication system, the communication system comprising  
3 the transceiver, the transceiver comprising a plurality of transceiver antennae, each  
4 transceiver spatially separate from at least one other transceiver antenna, each transceiver  
5 antenna further comprising a transceiver antenna polarization, at least one transceiver  
6 antenna having a polarization that is different than at least one other transceiver antenna,  
7 the communication system further comprising the receiver, the receiver comprising a  
8 plurality of receiver antennae, the method comprising:  
9       each transceiver antenna transmitting a corresponding data stream;

10 the receiver antennae receiving at least one data stream;  
11 electronic circuitry within the receiver estimating a channel matrix that represents  
12 a transmission channel between the transceiver antennae and the receiver antennae; and  
13 pre-setting the transceiver antenna polarization of each transceiver antenna by  
14 minimizing a singular value spread of the channel matrix.

1 20. (Original) The method of wirelessly communicating between a transceiver and a  
2 receiver within a wireless communication system of claim 19, wherein each receiver  
3 antenna is spatially separate from at least one other receiver antenna, each receiver  
4 antenna further comprising a receiver antenna polarization, at least one receiver antenna  
5 having a polarization that is different than at least one other receiver antenna, the method  
6 further comprising:

7 pre-setting the receiver antenna polarization of each receiver antenna by  
8 minimizing a singular value spread of the channel matrix.

1 21. (Original) The method of wirelessly communicating between a transceiver and a  
2 receiver within a wireless communication system of claim 19, the method comprising:  
3 pre-setting the transceiver antenna polarization of each transceiver antenna to  
4 minimize correlation between the data streams.

1 22. (Original) The method of wirelessly communicating between a transceiver and a  
2 receiver within a wireless communication system of claim 20, the method comprising:

3                   pre-setting the receiver antenna polarization of each receiver antenna to minimize  
4                   correlation between the data streams.

1   23. (CurrentlyAmended)   A wireless communication system ~~comprising:~~  
2                   a plurality of transceiver antennae, each transceiver spatially separate from at least  
3                   one other transceiver antenna, each transceiver antenna further comprising a transceiver  
4                   antenna polarization, at least one transceiver antenna having a polarization that is  
5                   different than at least one other transceiver antenna, each transceiver antenna transmitting  
6                   a corresponding data stream;  
7                   a plurality of a receiver, including one or more receiver antennae, the receiver  
8                   antennae receiving at least one data stream from a remote transmitter having a plurality of  
9                   transceiver antennae, at least one transceiver antenna having a polarization that is  
10                  different from at least one other transceiver antenna, each transceiver antenna  
11                  corresponding an associated data stream; and  
12                  means for setting the transceiver antenna polarization of each transceiver antenna  
13                  to reduce a measure of singular value spread of a channel matrix representation of a  
14                  transmission channel including at least a subset of the data streams between the  
15                  transceiver antennae and the one or more receiver antennae optimize separability of the  
16                  received data streams.

1   24.    *Please cancel claim 24 without prejudice.*

1 25. (Original) The wireless communication system of claim 23, wherein each receiver  
2 antenna is spatially separate from at least one other receiver antenna, each receiver  
3 antenna further comprising a receiver antenna polarization, at least one receiver antenna  
4 having a polarization that is different than at least one other receiver antenna.

1 26. (Currently Amended) The wireless communication system of claim 23, further  
2 ~~comprising a receiver that is connected to the receiver antennae, the receiver including~~  
3 ~~electronic circuitry for estimating a to estimate the channel matrix that represents a the~~  
4 ~~transmission channel between the transceiver antennae and the receiver antennae,~~  
5 ~~wherein the means for setting the transceiver antenna polarization of each transceiver~~  
6 ~~antenna is responsive to the electronic circuitry minimizing a singular value spread of the~~  
7 ~~channel matrix.~~

1 27. (Original) The wireless communication system of claim 25, further comprising  
2 means for setting the receiver antenna polarization of each receiver antenna to optimize  
3 separability of the received data streams.

1 28. (Original) The wireless communication system of claim 27, wherein a transmission  
2 channel between the transceiver antennae and the receiver antennae is estimated with a  
3 channel matrix, and wherein the means for setting the receiver antenna polarization of  
4 each receiver antenna comprises minimizing a singular value spread of the channel  
5 matrix.

1 29. (Original) The wireless communication system of claim 25, further comprising  
2 means for setting the receiver antenna polarization of each receiver antenna to optimize  
3 de-correlation of the received data streams.

1 30. (Original) The wireless communication system of claim 29, wherein a transmission  
2 channel between the transceiver antennae and the receiver antennae is estimated with a  
3 channel matrix, and wherein the means for setting the receiver antenna polarization of  
4 each receiver antenna comprises minimizing a correlation coefficient of the channel  
5 matrix.

1 31. *Please cancel claim 31 without prejudice.*

1 32. (New) A wireless communication system of claim 23, wherein the means for setting the  
2 transceiver antennae polarization resides within the receiver.

1 33. (New) A method comprising:  
2 receiving a plurality of signals from a remote transmitter, the remote transmitter  
3 transmitting the plurality of signals from two or more transceiver antennae, wherein at least one  
4 transceiver antenna has a different polarization than another transceiver antenna;  
5 developing a channel matrix representation of a transmission channel that includes at  
6 least a subset of the plurality of received signals; and

7 determining an improved polarization for at least a subset of the transceiver antennae to  
8 reduce a singular value spread in the developed channel matrix.